Chapter 2

Integrating ES&H Into Laboratory Activities

September 1994

Approved by the ES&H Working Group

_____ date _____

Ronald W. Cochran
Laboratory Executive Officer

2
Integrating ES&H Into Laboratory Activities*

Contents

Supplements

***Major chapter revision**
†Use the appropriate DOE Order

2

Integrating ES&H into Laboratory Activities

2.1 Introduction

2.1.1 General

Laboratory policy mandates that LLNL employees, the public, the environment, and property be protected against hazardous operations. The manner in which any activity performed at LLNL is planned and conducted is based on the following factors:

- The environmental, safety, and health (ES&H) hazards associated with the activity.
- Local, state, and federal codes; standards; orders; and laws applicable to the activity.
- Laboratory policy.

This chapter describes how to apply the process of evaluating, planning, integrating and documenting the various elements of the LLNL ES&H Program into experiments, operations, jobs, and projects performed by the Laboratory. In addition, the chapter contains Appendix 2-A, "Terms and Definitions"; Appendix 2-B, "Graded Approach and Managing Risk"; and Appendix 2-C, "ES&H Integration Worksheet." Guidance on how and when to prepare an operational safety procedure (OSP) or a facility safety procedure (FSP) can be found in Supplement 2.02. Additional guidance on specific topics is provided in other health and safety supplements.

2.1.2 Work Process

All work activities go through a life cycle that consists of five identifiable phases: conception, design / plan, production / procurement, operations, and termination / disposal. ES&H issues have an impact on each of these phases. The work process illustrated in Fig. 2-1 represents how ES&H issues are integrated into LLNL work.

The work process described in this chapter is applicable to large, complicated operations and projects as well as small, routine activities and experiments. It is similar to the "Plan, Do, Check, Act" cycle of Total Quality Management (TQM), with expanded details in the planning and preparation phase.

2.1.3 Graded Approach and Managing Risk

To protect the health and safety of employees and the public and to prevent damage to property or the environment, the Laboratory is committed to managing risk and complying with ES&H regulations whenever work is performed. Research and development frequently involves working at the limits of technical understanding and can generate unique risks. The challenge is to identify and manage those risks. It is therefore essential that all individuals work proactively to anticipate hazards, implement effective controls, and comply with ES&H regulations so that activities occur in a timely manner; at a reasonable cost; and in compliance with health, safety, and environmental requirements.

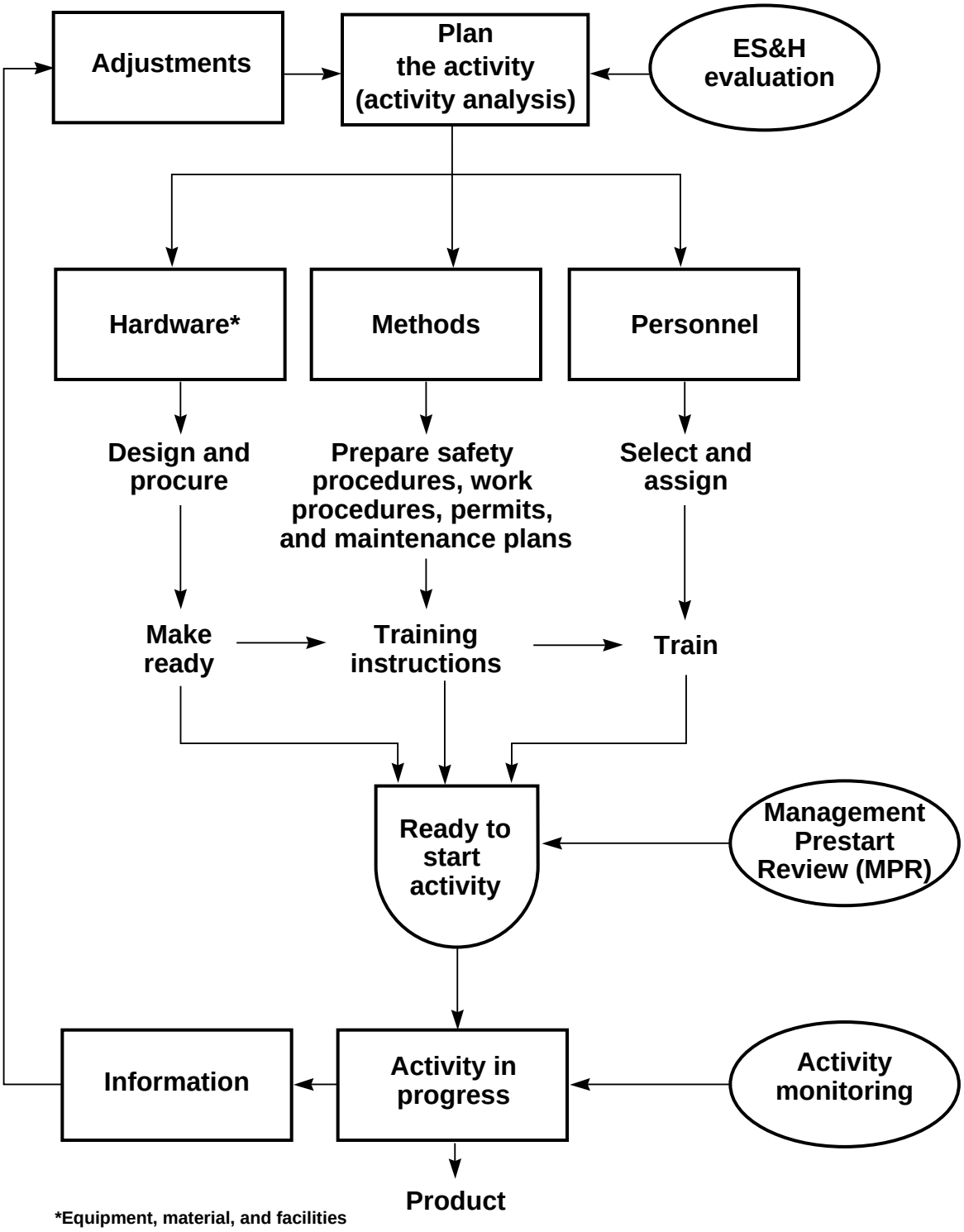

Figure 2-1. Work planning and execution process. The ovals highlight ES&H evaluations that take place in the cycle.

The ES&H effort required for work performed at LLNL can be adjusted using a graded approach (see Appendix 2-B). This graded approach involves assessing the hazard(s) (i.e., the danger inherent in an activity) and managing the residual risk (i.e., the danger remaining after controls have been implemented). The greater the risk, the greater the level of control required to manage it. It is important to remember that risk is a function of two variables: (1) the probability that an undesirable event will occur, and (2) the severity of the consequences of the event. Although different activities demonstrate varying degrees of hazard, all operations should be managed such that they present a low risk to employees and the public.

The potential impact of a work activity may extend beyond ES&H considerations. A significant part of this impact may result from consequences not related to injury or damage (e.g., penalties and/or poor public relations). Thus, the graded approach takes into consideration applicable regulations and public impact as well as the nature of the activity, associated hazards, life cycle, complexity, and cost effectiveness.

The controls in the *Environmental Compliance Manual* (previously called the *Environmental Protection Handbook*) and its subsidiary guidelines and the *Health & Safety Manual* and its supplements (herein referred to as the ES&H Manuals) are designed to reduce specific health and safety hazards and environmental concerns to an acceptable risk level. The "as low as reasonable achievable" (ALARA) objective (see Chapter 1, Section 1.01) means to manage and reduce risk to a point where it cannot be further reduced at an acceptable cost/benefit ratio. In addition, this objective requires that the residual risk be reviewed to determine if it can be further reduced at an acceptable cost.

Concurrence on accepting residual risk is required among program and facility management, with assistance from the ES&H team. If concurrence cannot be reached, the issue will be brought to upper line management's attention so that the situation can be resolved.

For more information on the graded approach and managing risk, see Appendix 2-B. Additional guidance is also available from the ES&H teams and the Directorate Assurance Managers.

2.2 Planning the Activity

It is important to identify critical ES&H issues in the planning stage of any activity. General objectives are identified in the conceptual phase. As the planning of the activity progresses, the following steps (see Fig. 2-1) need to be taken:

1. Conduct an evaluation to identify the safety and health hazards and the environmental concerns associated with the activity.
2. Evaluate the risk of conducting the operation safely and in compliance with accepted standards and regulations.
3. Determine the controls necessary to conduct the operation safely and in compliance with accepted standards and regulations.
4. Identify and prepare the documents necessary to conduct the operation.

5. Design and procure the equipment, materials, and facilities.
6. Select and train personnel.
7. Conduct a final prestart review.

2.2.1 Conducting the ES&H Evaluation

All activities, no matter how seemingly insignificant, require the Responsible Individual to critically evaluate ES&H issues. This evaluation consists of scoping the activity, evaluating potential hazards and environmental impacts, evaluating the risk, and determining controls to prevent undesirable events. For simple, low risk, routine operations, this evaluation may require only a moment's consideration before proceeding. Where the complexity, level of risk, or management concerns associated with the operation warrant, this evaluation shall be documented.

Because of the wide range of activities undertaken by LLNL, it is impossible to provide an exact threshold for every instance where a written evaluation shall be performed. Therefore, it is left to the Responsible Individual, working in concert with line management, facility management, and the ES&H team, to determine at what levels such a documented evaluation will be performed. For many activities, this review can be a simple screening analysis to verify that the proposed activity is already covered by existing ES&H documentation. The ES&H Integration Worksheet in Appendix 2-C can be used for this screening. This worksheet should be completed by the Responsible Individual for all proposed new activities requiring minimal written evaluation and submitted to the Facility Manager and the ES&H team. A worksheet should also be submitted to the Facility Manager when proposing a significant change to an activity. Other forms may be used as individual Directorates deem useful; however, any documented screening shall include

1. The nature and location of the proposed operation;
2. The hazards and controls associated with the proposed operation;
3. The name of the Responsible Individual;
4. Approval by the Facility Manager.

The Facility Manager can authorize the activity to proceed if the activity or change is adequately covered under the umbrella of the ES&H Manuals (or by an OSP or FSP) and does not

- Require or modify a permit, change hazardous waste or environmental impacts, or involve new or modified pollution abatement devices (unless the change reduces the requirements for these items);
- Involve new hazards and / or risks, or increase existing risks;
- Involve special or unusual activities (i.e., aviation, firearms, offsite locations, non-LLNL personnel, hazardous-for-working-alone);
- Involve decontamination, decommissioning, major building renovation, demolition, or ground-disturbing activities;
- Require medical surveillance by the Health Services Department or personal monitoring by the Hazards Control Department;

- Involve installation of safety systems requiring maintenance;
- Involve a nuclear or accelerator facility that may require DOE authorization.

If reviews and controls beyond the screening analysis are required, the Responsible Individual should contact the ES&H team for assistance with identifying and preparing the appropriate documents described in Section 2.2.3.

2.2.2 Determining the ES&H Controls

A control is a barrier between a hazard and people, property, or the environment. The need for controls is identified during the ES&H evaluation process. There are two types of controls: engineered and administrative. Examples of engineered controls include containment, shielding, interlocks, fences, barricades, and guards. Examples of administrative controls are training, maintenance procedures, warning signs, checklists, task instructions, personal protective equipment, and hazardous material quantity limits. In most cases, a combination of controls is used.

The hierarchy for effectively controlling hazards are as follows:

1. Eliminate the hazard by revising the design of the activity.
2. Reduce the hazard level by reducing the degree of severity or the probability of occurrence through redesign or re-engineering of the activity.
3. Provide safety devices (e.g., guards, interlocks, shielding).
4. Provide warning devices (e.g., horns, flashing lights, signs).
5. Provide safety procedures, also known as administrative procedures, and personal protective equipment.

Effective controls are installed engineering safety equipment. Administrative controls are less effective because they are strongly influenced by such things as subjective interpretation, job pressure, distraction, forgetfulness, and population variability. For example, building an x-ray machine so it is physically impossible for workers to get their fingers into the radiation beam is better than using an interlocked chamber to prevent exposure to the beam, which in turn is better than training the operator not to put his/her fingers in the beam.

2.2.3 Determining the ES&H Document Requirements

In general, documentation beyond the ES&H Integration Worksheet is not required if the operation is covered under existing documentation. However, documentation (activity or facility related) may need to be revised or prepared by the responsible manager

- When specifically required by the ES&H Manuals to control potentially hazardous activities.
- For activities whose controls deviate from those required by existing documentation.
- When required by Supplement 2.02 of the *Health & Safety Manual*;

- When the activity is in a nuclear facility (some DOE rules, orders, and LLNL *Health & Safety Manual* supplements have not yet been issued, so the reference list is incomplete).
- At management's initiative.

Safety Analyses. Specific analyses used to determine facility classifications are described as follows:

- *Preliminary Hazards Analysis.* A Preliminary Hazards Analysis (PHA), which documents the hazard classification of the facility, is prepared by the Hazards Control Department. The hazards of each LLNL facility must be evaluated and assigned a classification of either excluded, low, moderate, or high for non-nuclear facilities; and / or Category I, II, or III for nuclear facilities.
- *Safety Analysis Reports.* A Safety Analysis Report (SAR) is required for LLNL nuclear facilities as well as for other non-exempt facilities. A graded approach is used to prepare these documents. Contact your ES&H team for more detailed information.
- *Technical Safety Requirements.* Technical Safety Requirements (TSRs) set limits on an activity (pressure, temperature, amount of material, etc.) within a nuclear facility. They are required for activities performed at LLNL nuclear facilities and may also be required for activities performed at other non-exempt facilities. Contact your ES&H team for further details.

The above analyses must conform to the specific content and format described in the *Health & Safety Manual* and its supplements as well as to applicable DOE orders. In addition, any hazards and limits identified in the TSRs and SARs must be incorporated into or referenced in the FSPs.

Environmental Documentation. Preparation of the documents listed below may involve a large effort. Lead time for preparation and approval can vary from a few weeks to several years. Contact your ES&H team for detailed guidance.

- *NEPA/CEQA Documents.* Proposed actions or changes to existing activities must be evaluated by management to determine the environmental impact review requirements. Because LLNL facilities are federally owned and operated by the University of California, both the requirements set forth in the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) apply.
- *Permits.* Regulating agencies place controls on the Laboratory's discharges to the air, storm water drains, and sewer system through the use of permits. New projects must be analyzed to determine applicable permitting requirements. Contact your ES&H team for assistance.
- *Pollution Prevention/Waste Minimization.* Pollution prevention / waste minimization (PP / WM) activities are covered by the pertinent Directorate's PP / WM Plan. New activities shall to be reviewed to identify possible PP / WM techniques.

Facility Safety Procedures and Operational Safety Procedures. There are two types of procedures that govern LLNL operations:

- *Facility Safety Procedures.* FSPs describe safety and environmental controls for long-term activities in facilities, and are required for each non-excluded hazard-ranked facility or group of facilities. An FSP may also limit or deny authorization for an activity that would otherwise be permissible (see Supplement 2.02). FSPs are issued every three years and must be reviewed and reissued before the end of the three years. If, prior to the next review or reissue date for an FSP, a need arises for additional controls, a change to the FSP may be issued.
- *Operational Safety Procedures*. OSPs may be required for individual, limited-term activities unless the ES&H issues involved are adequately covered by the ES&H Manuals or in the FSP for the facility in which the activity will take place. If the activity will take place in a facility covered by an FSP, then the OSP will either add to or limit the authorization provided by that FSP. OSPs usually are incorporated into FSPs when activities become long term with no changes in procedures. See Supplement 2.02 for details on preparing OSPs. OSPs are issued every year and must be reviewed and reissued before the end of the one-year period.

LLNL-Issued Work Permits. An LLNL permit is required for certain types of operations to ensure that potential hazards are identified and the necessary precautions are in place before beginning work. Table 2-1 lists the various types of permits required.

Operating Procedures. Operations and experiments may require additional procedures when sufficiently complex and/or hazardous, and when it is possible an unacceptable error could occur. These procedures should include the following elements:

- A description of required materials and personnel qualifications.
- Concise instructions in a logical sequence.
- Indications of what could initiate problems.
- Expected alarms or equipment operations.
- Actions to be taken in response to an unusual event.

Other Documentation. Other ES&H-related documentation that may be required for an activity or facility include the following:

- *Conduct of Operations Workbook.* A Conduct of Operations Workbook (see Supplement 2.19) must be prepared for all facilities or activities except those classified as excluded. It is also recommended that this workbook be used as a guide for operation of excluded facilities or activities.
- *Decontamination and Disposition Plans*. See Supplement 2.30, "Guidelines for Decontamination and Disposition of Radioactively Contaminated Facilities and Associated Equipment."
- *Quality Assurance Plans.* These documents may be required for certain activities. Check your Directorate Quality Assurance Plans (DQAPs).

Table 2-1. Types of permits issued at LLNL.

PERMIT for	IS issued by
Soil evacuation, grading, and/or drilling	Plant Engineering to ensure documentation of any underground utility for safety purposes and to track soil for ES&H purposes.
Building and/or equipment drain[a]	Plant Engineering to ensure compliance with the Laboratory's Storm Water Pollution Prevention Plan.
Interior concrete floor, wall, and ceiling penetration	Plant Engineering to ensure the safety of personnel, systems, and utilities at the Laboratory.
Asbestos work	ES&H team to ensure limited-scale work performed by LLNL and SLO personnel are in compliance with regulations. See Supplement 21.19 for details.
Work in confined spaces	ES&H team to ensure personnel working in such areas are protected from hazards.
Hot work	ES&H team to ensure personnel who perform welding, soldering, and other hot-work operations with a high fire potential are aware of and protected from hazards.
Hazardous work (explosives) (Form LL-1968)	ES&H team to ensure new construction, modification, maintenance, or repair work performed in any area designated as an explosives storage or handling area at LLNL-Livermore or Site 300 is in compliance with regulations. See Chapter 24 for details.
Lead work[b]	ES&H team to ensure that any operation that will result (or may be reasonably expected to result) in exposure above the exposure limit is performed in compliance with regulations. See Supplement 21.20 for details.
Radiation work	ES&H team to ensure that the magnitude of radiation hazards and procedural, physical, and administrative controls are identified. See Supplement 33.02 for details.
Roof access	ES&H team to ensure that personnel who access the roofs of buildings with Types A (restricted access) and B (limited access) classifications do so in accordance with regulations. See Supplement 26.21 for details.

[a]Any equipment or fixture that discharges water into the environment or a sanitary sewer system must be documented and a permit issued if discharge destinations or sources affected.

[b]A permit is not required if the operation is described in a current safety procedure or a current negative exposure assessment.

2.2.4 Design, Procurement, and Preparation of Equipment and Materials; and Personnel Selection and Training

- *Hardware.* Structures and mechanical equipment must be designed and built in accordance with Mechanical Engineering Design Safety Standards (M-012). A safety note shall be prepared by a qualified individual if a significant hazard is associated with the piece of equipment or if the design does not conform to a prescribed standard (see Chapter 6 of the *Health & Safety Manual*). Seismic, experimental structures and pressure systems are some of the areas covered by mechanical engineers. Electronics Engineering Department personnel design and implement electrical equipment and systems. When appropriate, they insure that these designs adhere to the *Electrical Engineering Standards Manual,* the National Electric Code, and other codes and standards. The Plant Engineering Department is responsible for building and utility designs and for insuring adherence to the applicable codes and standards. If the equipment is to be procured from an outside manufacturer, safety criteria must be specifically detailed in the requisition. In addition, procurement orders for some hazardous materials or equipment (e.g., carcinogens, radioactive material, x-ray machines) and some types of personnel protective equipment (e.g., fall protection devices, respirators) may require review and approval by the ES&H team. A hazard analysis, according to Section 2.2.1, shall be done whenever there may be deviations from the manufacturer's operating specifications and limits.
- *Personnel Training.* ES&H training requirements are described in the LLNL *Training Program Manual.* Training requirements are also listed in OSPs and FSPs, or in separate training plans. In addition, there are specific training requirements for individual job functions and specific kinds of facilities. It is best to check with the ES&H team to determine which training requirements apply. Training requirements for personnel should be forwarded to the appropriate directorate training coordinators to ensure entry into the proper tracking databases. Training organizations must file completed courses with the Laboratory Repository of Completed Courses (LROCC).

2.2.5 Prestart and Readiness Reviews

The manager (supervisor, Facility Manager, or principal investigator) of a new or revised operation shall ensure that a review of the operation is conducted prior to startup. An operation shall begin only if all of the following conditions have been met:

- The hardware and tools are available, the facility is operable, and the equipment is tested.
- The required safety systems are correctly installed and tested, and the appropriate personnel are trained in the proper use of these systems.
- The activities and/or experiments are ready; procedures are complete; maintenance of safety systems is scheduled (see Section 4 of the *LLNL Maintenance Program Guidance Manual*); ES&H documentation is completed, and permits are issued.
- Personnel know their responsibilities and are trained and certified, if needed, for the operation.

A formal Operational Readiness Review (ORR) is required for most nuclear facilities, and a Readiness Review (RR) is required for accelerator facilities. DOE or LLNL management may also require prestart reviews, RRs, or ORRs for other facilities, operations, and complex experiments. Guidelines for conducting an ORR are given in the *Planning and Conduct of Operational Readiness Reviews (ORRs)*, DOE Standard 3006-93. Documentation for these reviews shall include the date of the review, a list of the participants, the topics covered, and any discrepancies identified or improvements made. If discrepancies are identified, include requirements for their resolution.

2.3 Performing the Activity

2.3.1 Conducting the Activity and Making Changes to the Activity

All activities shall be carried out as described in Section 2.2. Changes to an existing activity or facility that meets the criteria described in Section 2.2.1 should be treated as new activities, and the guidelines outlined in Section 2.2 should be followed. The guidelines in Supplement 2.21, "Implementation Guide for the Unreviewed Safety Question Process," must be followed for nuclear facilities. Unreviewed Safety Issues (USIs) are the analog to Unreviewed Safety Question (USQs) for accelerators.

2.3.2 Monitoring the Activity

For the purpose of monitoring the ongoing activity, each directorate is required to implement an ES&H self-assessment program (see Supplement 2.04; previously 1.08). The self-assessment plan describes the assessment of existing activities, experiments, and facilities. Deficiencies are tracked in the tracking database known as the LLNL Deficiency Tracking (DefTrack) System.

It is important when monitoring the activity to ask the following questions:

- Are the work instructions and safety procedures appropriate for the operation?
- Are employees following the work instructions and safety procedures?
- Is the activity in compliance with all applicable LLNL manuals?
- Is personnel training taking place in accordance with the safety procedure?
- Is additional training required?
- Is the equipment being maintained as required?
- Are the proper controls in place?
- Are controls operating as required?
- Are wastes and hazardous materials being properly handled?
- Are required records being maintained?
- Are there new ES&H concerns or requirements?
- Are there indications that an accident is about to happen?
- Are there "Lessons Learned" from similar activities that should be incorporated?

Both planned and unplanned changes, as well as unexpected events, must be evaluated to determine if they are within the established ES&H envelope (see Appendix A for

definition) and meet all ES&H requirements. For unplanned events, the root cause should be identified so that appropriate adjustments can be made to hardware, methods, and personnel qualification and training. This adjustment loop is similar to Continuous Quality Improvement (CQI).

2.4 Terminating the Activity

Sufficient resources must be provided to assure safe shutdown of activities and facilities. As appropriate, one or more of the following documents are to be used by the Responsible Individual and line management when evaluating and documenting the shutdown or closure process:

- Supplement 2.10, "Shutdown, Surveillance, and Maintenance Plan," which includes the Laboratory Shop / Experiment Closeout Procedure.
- Supplement 2.30, "Guidelines for Decontamination and Disposition of Process Contaminated Facilities and Associated Equipment."

Contact your ES&H team to determine whether an environmental closure plan will be necessary.

The ES&H Integration Worksheet (Appendix 2-C) should be completed by the Responsible Individual and submitted to the Facility Manger and ES&H team for evaluation of the terminating activity.

2.5 Supporting References and Standards

LLNL Maintenance Program Guidance Manual: Non-Nuclear, Section 4.0, "Application of the Graded Approach to Maintenance Activities," LLNL Capital Assets Management Office (Draft).

Planning and Conduct of Operational Readiness Reviews (ORRs), DOE Standard 3006-93.

Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports, DOE-STD-3009-94, July 1994.

Design Safety Standards, M-012, Mechanical Engineering Department, Lawrence Livermore National Laboratory, Livermore, CA (latest edition)

Electrical Engineering Standards Manual, Electrical Engineering Department, Lawrence Livermore National Laboratory, Livermore, CA (latest edition).

Environmental Compliance Manual, Environmental Protection Department, Lawrence Livermore National Laboratory, Livermore, CA (draft).

Appendix 2-A

Terms and Definitions

ALARA	As low as reasonably achievable.
CEQA	California Environmental Quality Act.
conduct of operations (CONOPS)	A set of guidelines that governs the work performed in LLNL facilities.
control	The means of mitigating a hazard.
CQI	Continuous Quality Improvement.
ES&H Manuals	The LLNL *Health & Safety Manual* and its supplements, and the LLNL *Environmental Compliance Manual* and its subsidiary guidelines.
envelope or safety envelope	The safety limits applied to a facility or an activity. This usually includes (1) the physical boundaries of the facility or activity; and (2) limits on the quantity of hazardous or radioactive material that may be present, including other parameters such as voltage, energy, temperature, and pressure that may be used or present.
excluded facility	A facility that is not designated by DOE as a nuclear facility (e.g., Plutonium Facility) or by LLNL as a high-, moderate-, or low-hazard non-nuclear facility (e.g., light industrial shop, office building).
facility manager	The LLNL employee who has been delegated responsibility for facility operations.
FSP	Facility safety procedure.
hazard	A potential source of an accident.
MPR	Management Prestart Review.
NEPA	National Environmental Policy Act.
non-excluded facility	A facility that is designated by DOE as a nuclear facility (e.g., Plutonium Facility) or by LLNL as a high-, moderate-, or low-hazard non-nuclear facility (e.g., Pesticide Storage Facility).

non-nuclear facility	See DOE Standard 1027.
hazard level	
nuclear facility category	See DOE Standard 1027.
ORR	Operational Readiness Review.
OSP	Operational safety procedure.
permit	Written authorization from a regulatory agency.
PHA	Preliminary Hazards Analysis.
responsible individual	The LLNL employee that is immediately responsible for the activity and for ensuring the activity complies with ES&H requirements.
risk	The probability that an undesirable event will occur, and the severity of the consequences of that event.
RR	A Readiness Review, which is specific to accelerator facilities and is based on the requirements of DOE Order 5480.25, “Safety of Accelerator Facilities.”
SAR	Safety Analysis Report.
TQM	Total Quality Management.
TSRs	Technical Safety Requirements. TSRs set the limits for an activity or a value (pressure, temperature, amount of material, etc.). They are required for activities performed in LLNL nuclear facilities.
USI	Unreviewed Safety Issue (for accelerators).
USQ	Unreviewed Safety Question (for nuclear facilities).

Appendix 2-B

Graded Approach and Managing Risk

The graded approach cannot generally be done using cookbook methods. Because its use is subjective, this process depends on the people involved in its application. The process of using the graded approach may be formal or informal, depending on the risk and the activity involved. The graded approach identifies the level of effort that would be cost effective or commensurate with the risk involved. A more rigorous effort may be requested at management's discretion. One means for performing the graded approach would be to carry out the following steps:

1. Conduct a preliminary evaluation of the activity to determine the ES&H issues and other potential impacts.

2. Evaluate the risks and other possible impacts associated with the activity. If available information is not sufficient to determine the risks, then postulate the consequence(s) of potential failure of the equipment or procedures.

3. Consider the requirements imposed by the hazard classification of the facility in which the activity is to take place. The ES&H team can provide guidance on the hazard classification of LLNL facilities.

4. Refer to Table 2B-1 to determine the appropriate level of formality required for ES&H evaluation and documentation.

Table 2B-1. Graded approach in ES&H integration.

Category*	High/1	Medium/2	Low/3	Excluded
Public Safety	May cause death or serious injury to a member of the public	Minor injury, irritation, or annoyance	Not Applicable	Not Applicable
Employee Safety	—	Death or serious (disabling) injury or illness of a Lab worker	Minor injury or illness	Not Applicable
Environmental Risk	Severe damage to the environment beyond the boundaries of LLNL	Localized contamination requiring clean up within LLNL boundaries	Contamination limited to immediate facility area requiring minor clean up	Contamination release within allowable limits
Mission or Economic Impact	—	May result in total loss of major facility; major process capability; or severe mission or economic impact	Damage to a facility or process with serious mission or economic impact	No damage or minor damage resulting in inconvenience
Community Concern	—	Public trust and the Lab or UC credibility are likely to be damaged	Most area residents or employees will express concern. Occasional negative regional media coverage; potential for fines or civil penalties	At most, a small number of area residents might express concerns but will forget within a year; any potential for penalty is acceptable
Formality	Extensively rigorous and formalized; DOE approval involved; SAR/ ORR used	Formalized to employ all reasonable controls to mitigate risks; SAR/ORR used	Formalized documentation of controls; SAR may be necessary if nuclear facility involved; FSP/OSP and MPR may be required	ES&H Integration Worksheet as required (see Appendix 2-C); generally informal, but *DOE-NEPA review* may be required; hazards generally covered in the *ES&H Manuals*

* The category names are for hazard ranked, non-nuclear facilities. The numbers are for nuclear facility categories listed in DOE Standard 1027-92.